ABSTRACT OF THE DISCLOSURE

Provided are a powder heat treatment process, wherein fine carbon fibers are heated in a heating furnace at a temperature of 800°C or higher under an inert gas atmosphere or a hydrogen gas atmosphere in the form of powder taken out from a reaction furnace for producing the fine carbon fibers or after compressing and crushing the fine carbon fibers to turn them into amorphous powder without filling them into a specific vessel or compaction-molding them to thereby vaporize volatile components stuck to the fibers and carbonize them at a higher temperature and powder heat treatment equipment, wherein a heating furnace part is partitioned by push-in plates for fine carbon fibers or stirring devices in the furnace; a surrounding gas-discharging port is provided in a part close to a fiber-charging port out of compartments partitioned by the above plates or devices; and a gas-feeding port is provided in a part close to an outlet for the above fibers.